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CONTENTS:

LIFE HISTORY NOTES ON TWO SPECIES OF SALDIDÆ (HETEROPTERA),
Grace Olive Wiley.

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VOL. XIV.] OCTOBER, 1922. [No. 9.

Life History Notes on Two Species of Saldidæ (Hemiptera) Found in Kansas.*

BY GRACE OLIVE WILEY.

THE family characteristics of the saldids are so well known that a description need not be given here. A few brief notes on certain Kansas species, however, may be of interest.

Nymphs in the third and fourth instars were taken June 1, 1920, along a little ravine leading to a pond or pool which contained water only during the spring and early summer when rains were frequent. This little freshet and pond were in a small pasture just outside the city limits of Chanute, Kan. Here, within a few blocks of home, I found two different species of saldids, though in not very plentiful numbers.

Knowing that no Kansas saldid had yet been reared, I captured all the lively little fellows I could and sat about the task of rearing them. One was a large black species, the other a much smaller species.

THE LARGE BLACK SALDID.

Saldula major (Prov.).

June 12 there were two adults, and by June 18 the others had reached the adult state and were mating. June 21 I found twelve newly laid eggs on a blade of grass. These hatched July 3. With what pleasure and interest these active little fellows were watched! The adults were shy, but very inquisitive, and when food was placed in their dish they were always ready to run up and take a look at it, curiosity-bent, it seemed; or when removing food that had been given to them the day previous, they were equally curious to see what was going on. Not so with the smaller species; they were always trying to get away or hide.

*I wish to thank Dr. H. B. Hungerford for his help and kindly criticism and for the loan of a binocular from the University.

The nymphs liked to stay hidden most of the time, but would come out and feed quite readily. It was interesting to see one of the little fellows prodding around an insect for a soft spot in which to insert its needlelike beak. Nor does it disturb one of them in the least to remove the insect and place same under the binocular to watch the process of feeding.

The newly emerged nymphs, either from the egg or molt, are very bright red in color, with eyes, antennæ, beak and legs very dark. They become dark, however, in a very short time, except the nymphs which emerge from the eggs; these are red for more than a day. The adults are very pale pink or yellowish when they first emerge, with eyes, antennæ, beak and legs very dark. They become dull black in a short time, with rather pale, obscure markings on the wing covers.

DESCRIPTION OF STAGES.

See plate XXXIV.

THE EGG.

Size. Length about 1.2 mm.; width across widest part, .3 mm.

Color. Pearly white and transparent when first laid, becoming yellow in color three days later. The fourth-day egg shows red eyelike spot, and two days later the entire egg becomes red in color; another day later, making seven days from time egg was laid, it is blood red with very dark, eyelike spots. When nine days old the egg is orange red, and on the twelfth day the nymph emerges. A few hours before hatching the egg becomes pale or whitish in color.

Shape. General shape shown by drawing. It is elongate, larger and more broadly rounded at one end, tapering and much smaller at the other end, with dorsal part arched.

FIRST INSTAR.

Size. Total length of one day-old nymph, about 1.1 mm.; width across abdomen, .6 mm.

Color. Red to light reddish brown, with dark spot on fifth abdominal segment, on the median line of the dorsal part. Eyes, legs, beak and antennæ black.

Structural peculiarities. Rostrum reaching to the apex of the posterior coxæ. Antennæ four-segmented, last joint darker in color and larger than the others. Tarsi one-jointed. Length of first stage, four days.

SECOND INSTAR.

Size. Length about 1.8 mm.; width across abdomen about 1 mm.

Color. Dark reddish brown on dorsal part, with ventral part red. Venter very dark brown, nearly black.

Structural peculiarities. Antennæ four-segmented, with last segment larger than the other segments. Rostrum reaching to the base of the posterior coxæ. Antennæ and legs covered with very fine black hairs, some longer and more sparsely placed than the others.

Shape. A trifle stouter than first-instar nymph.

THIRD INSTAR.

Size. Length from 2.25 to 2.5 mm.; width across abdomen from 1.3 mm. to 1.4 mm.

Color. Color on the dorsum very dark brownish black, with ventral parts brown.

Shape. Much the same as the second instar, only much stouter.

FOURTH INSTAR.

Size. Length, 3.25 mm. to 3.5 mm.; width across abdomen, 1.9 mm. to 2 mm.

Color. Shining black over entire part; most of the ventral part black except the throat and around the legs, which is slightly paler in color, also the anterior and lateral parts of the carina or keel of the abdomen, which is whitish in color; venter very dark.

Shape. Decidedly stouter than third instar and wing pads now much in evidence.

Structural peculiarities. Rostrum reaching to the apex of the posterior coxæ. Ventral part of the abdomen carinated. Antennæ long, rather stout, and covered, as in the third instar, with fine black hairs.

FIFTH INSTAR.

Size. Length from about 4.5 mm. to 4.8 mm.; width across abdomen at widest part, 2.5 mm. to 2.625 mm.

Color. All of dorsum shining black in color. Ventral parts same as in fourth instar, as are also the antennæ and legs. Second joint of antennæ decidedly longer and more slender than any of the other joints. Rostrum reaching to the base of the posterior coxæ. Eyes emarginate. Wing pads reaching to the apex of the second abdominal segment.

THE ADULT.

Size. Female: length of the body, not including the antennæ and legs, 6.5 mm. to 6.875 mm.; width, 2.8 to 3 mm. Male: length, 6.25 mm.; width, 2.625 to 2 mm.

Color. Entire insect dull black with a few obscure, pale markings. Body oblong, oval. Ocelli slightly apart. Head long and tapering to the front. Eyes large, emarginate and strongly exserted. Scutellum rather flat with a depression in center of disk. The posterior lateral margins of pronotum and the anterior margins of hemelytra slightly reflexed. Rostrum long and slender, first joint short and thick, second joint very long, the tip reaching to the base of the middle coxæ; third joint reaching to the base of the posterior coxæ. Color of beak black and shining, with tip slightly paler. Antennæ very black, stout and long; basal joint stout and considerably shorter than third or fourth joints; second joint very long and slender; last two joints nearly the same length; last joint slightly longer than the next to last. Body covered with sparse, closely appressed, golden pubescence. Membrane furnished with four areas.

Oviposition. The eggs are deposited at the base of grass blades, or are thrust with the sharp ovipositor through the blades of grass. (See plate XXXIV.)

Incubation. Twelve days.

Maturity. Adults come from eggs in twenty-eight days.

General notes. Length of first instar, four days; of second instar, three days; of third instar, three days; of fourth instar, two or three days; of fifth instar, four days. No ocelli are present in any of the nymphal stages.

MEASUREMENTS IN MILLIMETERS OF NYMPHS AND ADULTS OF LARGE SPECIES KANSAS SALDID.

Instar	Body measurements, m m.						Leg measurements, m m.								
							Fore leg.			Middle leg.			Hind leg.		
	Length	Width	Across eyes	Width, shoulder	Length, antennæ	Beak	Femur	Tibia	Tarsi	Femur	Tibia	Tarsi	Femur	Tibia	Tarsi
1st	1.1	.6	.4	.5	.6	.7	.3	.25	.1	.35	.3	.15	.4	.4	.2
2d	1.8	1.0	.7	.75	1.0	1.1	.5	.4	.2	.5	.45	.25	.6	.7	.3
3d	2.5	1.4	.9	1.0	1.3	1.6	.6	.5	.25	.7	.6	.3	.8	1.0	.4
4th	3.5	1.9	1.1	1.3	2.0	2.0	.9	.7	.3	1.0	1.0	.4	1.2	1.5	.6
5th	4.8	2.5	1.4	1.9	2.7	2.7	1.2	1.0	.5	1.5	1.2	.6	1.6	2.2	.9
6th♀	6.5* 6.75†	2.8	1.5	2.0	3.5	3.0	1.5	1.3	.7	1.6	1.6	.8	2.0	3.0	1.25
6th♀	6.0* 7.0†	3.0	1.5	2.25	3.5	3.5	1.8	1.4	.7	1.8	1.6	.7	2.2	3.0	1.25
6th♂	6.0	2.8	1.5	2.0	3.5	3.0	1.5	1.4	.7	1.8	1.6	.8	2.0	3.0	1.25

* Venter. † Elytra.

These measurements were made with micrometer, Bausch and Lomb binocular, 6.4 oculars, 55 mm. objectives. By placing millimeter ruler under binocular, micrometer measured ten lines to the millimeter. Thus: 10 lines micrometer = 1 mm.

SMALL SPECIES OF KANSAS SALDID.

Saldula pallipes Fabr. (?)*

From adults reared from nymphs captured June 1, 1920, along with nymphs of a large black species of saldid, I obtained, June 23, several clear creamy-white eggs, thrust in the stems and blades of grass growing in the jars in which these saldids were confined. These were not the first eggs laid, however, as I also found several small nymphs, but the eggs had been so cleverly hidden that I had not found them. These eggs hatched July 1 to 3, and became adults sixteen days later. Eggs from this second generation hatched August 13 and August 20, becoming adults also in from sixteen to seventeen days from the time the nymphs emerged from the eggs.

On the 28th of July I went to Texas to join my husband, who was in the employ of an eastern oil company. I could not think of

*Mr. Hungerford says this American species is not the same as the European species.

giving up the life histories of the two species of saldids I was rearing, so placing all the little glasses containing them in a covered basket, I took them with me. No doubt the people on the train thought I was taking a lunch with me, or perhaps a pet dog or cat! I wonder how many ladies would have slept well that night had they known that the basket contained live bugs!

In all the rearings I fed dead flies and other soft-bodied insects, chiefly mirids (capsids) and cicadellids (jassids), as these were usually easier to obtain in large numbers either by sweeping or at the light at night.

DESCRIPTION OF STAGES.

See Plate XXXV.

THE EGG.

Size. Length about .6 mm.; width, .15 mm.

Color. Clear, creamy-white when first laid, changing to yellow. Duration of egg stage, 8 to 10 days.

Shape. Elongate-cylindrical; one end broadly rounded and considerably larger than the other end. Dorsal part arched.

FIRST INSTAR.

Size. Length of body about .8 mm.; width of abdomen at widest part, .4 mm.

Color. Greenish brown with dark spot on the dorsum of abdomen along median line.

Structural peculiarities. Mostly head, with large, reddish eyes; four-segmented slender antennæ, fourth segment stouter than the others. Duration of first instar, four days.

SECOND INSTAR.

Size. Length, 1. mm.; width, .6 mm.

Color. Light green with eyes and antennæ dark reddish brown. Dark spot on the dorsum of abdomen.

Shape. Much the same as first instar only stouter. Duration of instar, three days.

THIRD INSTAR.

Size. Length, 1.5 mm.; width, .8 mm.

Color. Head and thorax yellowish; third and fourth abdominal segments dark green with spot on the dorsum orange yellow; remainder of abdomen yellowish green. Eyes and tip of antennæ dark brown.

Structural peculiarities. Tarsi segmented as in all the other instars; rostrum reaching to the posterior coxæ. Duration of third instar, three days.

FOURTH INSTAR.

Size. Length of body, 2 mm.; width of abdomen, 1.2 mm.

Color. Grayish flecked with brown.

Shape. Nymph much stouter than in the third instar, and wing pads reaching to the base of the second abdominal segment. Beak reaching to the apex of the posterior coxæ. Duration of fourth instar, 3 days.

FIFTH INSTAR.

Size. Total length, 2.7 mm. to 3 mm.; width, 1.5 mm. to 1.6 mm. in widest portion.

Color. Grayish brown speckled or mottled.

Structural peculiarities. Antennæ slender, four-segmented as in the other instars; fourth segment larger and stouter than the others; second segment longest and very slender; body, legs and antennæ covered with sparse, short, brown pubescence. Rostrum reaching to the apex of the posterior coxæ. Wing pads reaching to base of third abdominal segment. Duration of fifth instar, three days.

THE ADULTS.

Size. Length of the entire body, not including antennæ and legs: Female: 3.5 mm. to tip of abdomen; 3.9 to 4 mm. to tip of hemelytra; width of abdomen across the widest part, 1.6 mm. to 1.7 mm. Male: length 3 mm. to tip of hemelytra; width, 1.5 mm.

Description. Oblong-ovate, black above, closely invested with minute yellow pubescence; eyes large, rather oblong, brown, and very prominent. Ocelli reddish and slightly apart. Clypeus and tylus straw yellow; rostrum black and reaching upon the posterior coxæ. Ventral part body jet black; sternum and pectus closely appressed with silvery-white pubescence. Legs pale with dark markings. Pronotum and scutellum rather flat, disk of pronotum slightly elevated and with a minute depression in center of disk. Scutellum a little longer than broad. Hemelytra brownish black with grayish-white markings. Clavus with oblong spot at the apex. Corium with two squarish spots near the upper, outer margin and two very small spots on the posterior margin near membrane. Embolium mostly grayish white, there usually being three dark spots along the median nerve connected by a dark-colored line or nerve. Membrane gray with dark veins and furnished with four areas, each having one or more smoky spots therein. Antennæ slender, four-segmented; basal segment stoutest, dark underneath, pale above; second segment very slender and almost twice the length of the first segment; third and fourth segments about equal in length and stouter than the second.

MEASUREMENTS IN MILLIMETERS OF NYMPHS AND ADULTS OF SMALL SPECIES KANSAS SALDID.

Instar	Body measurements, mm.						Leg measurements, mm.								
							Fore leg.			Middle leg.			Hind leg.		
	Length	Width	Across eyes	Width, shoulder	Length, antennæ	Beak	Femur	Tibia	Tarsi	Femur	Tibia	Tarsi	Femur	Tibia	Tarsi
1st	.8	.4	.350	.3	.4	.4	.125	.12	.065	.15	.125	.070	.16	.25	.080
2d	1.0 to 1.1	.6	.4 .5	.45 .525	.5	.5 .6	.2	.2	.1	.3	.2	.125	.3	.4	.175
3d	1.5	.8	.6	.7	.8	.9	.4	.35	.1	.4	.35	.15	.5	.6	.2
4th	1.8 to 2.1	1. 1.2	.6 .7	.8 .9	1.0	1.1 1.2	.4 .5	.4	.2	.5 .6	.4 .5	.2	.6 .7	.7 .8	.25 .3
5th	2.7–2.9 to 3	1.5 1.6	.9 1.0	1.25 1.3	1.5	1.5 1.6	.7	.6	.25	.8 .9	.7	.3	.9 1.0	1.1	.5
6th ♀	3.5* 4.0† 3.9	1.6 1.7	1.0	1.3	1.6 1.7	1.6 1.7	.9	.7	.3	.9	.8	.35 .4	1.1	1.6	.6
6th ♂	3.0 to elytra	1.5	.9	1.2	1.5	1.5	.7	.6	.25	.8	.7	.3	.9	1.5	.5

* Venter. † Elytra.
Measurements made with micrometer same as in large species. 10 lines micrometer = 1 millimeter.

PLATE XXXIV.

THE LARGE SALDID.

Saldula major (Prov.).

FIG. 1. Stem of grass with some of the blades removed, showing egg of saldid.

FIG. 2. Under side of grass blade, showing tips of eggs through the opening made by the sharp ovipositor.

FIG. 3. Upper side of the same blade shown in figure 2, showing the eggs and how they were thrust through the leaf.

FIG. 4. Egg in a grass blade and part of the blade torn away to show the tip of the egg on under surface.

FIG. 5. The egg.

FIG. 6. Nymph just out of egg, still in postnatal molt.

FIG. 7. First-instar nymph.

FIG. 8. Second-instar nymph.

FIG. 9. Fourth-instar nymph.

FIG. 10. Third-instar nymph.

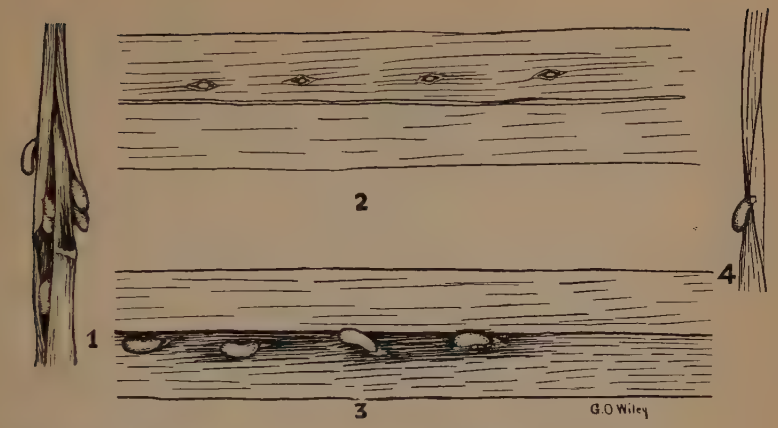
FIG. 11. Fifth-instar nymph.

FIG. 12. Adult male.

FIG. 13. Adult female, ventral view.

FIG. 14. Adult female, dorsal view.

PLATE XXXIV.



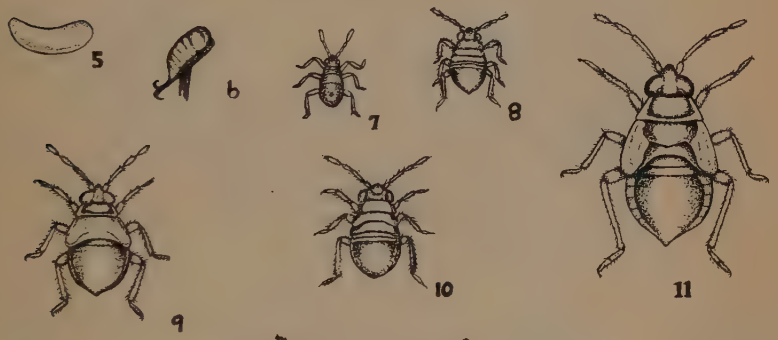


PLATE XXXV.

THE SMALL SALDID.

Saldula pallipes Fabr. (?)

FIG. 1. The egg.
FIG. 2. First-instar nymph.
FIG. 3. Second-instar nymph.
FIG. 4. Third-instar nymph.
FIG. 5. Fourth-instar nymph.
FIG. 6. Fifth-instar nymph.
FIG. 7. Adult female.
FIG. 8. Adult male.

PLATE XXXV.

1.

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7. ♀

8. ♂